Forensic Identification

Identification Justification

- Identification of flight crew vs pax
- Survivability assessment and reconstruction
- Reassociation of remains
- Identification of “odd man out”
- Settlement of estate
- Delivery of benefits
- Personal vs mass grave
- Closure for family

Types of identification

- Positive
  - Legal identification of a unique person based on comparison of pre-and post-mortem information
- Presumptive
  - Identifies the individual as a member of a sub-group
  - Can be legally certified only if several points of comparison are used and there are no discrepancies

Types of identification

- Positive
  - Dental comparison
  - Fingerprints
  - Palmprints
  - Footprints
  - DNA
  - Radiographic identification

OAFME 98-003

OAFME 98-001

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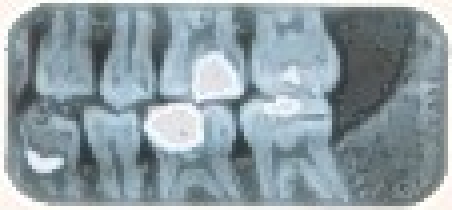
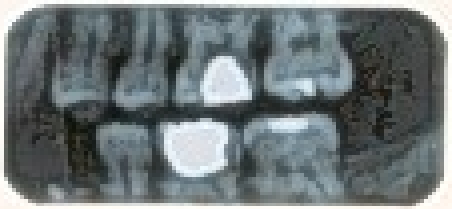
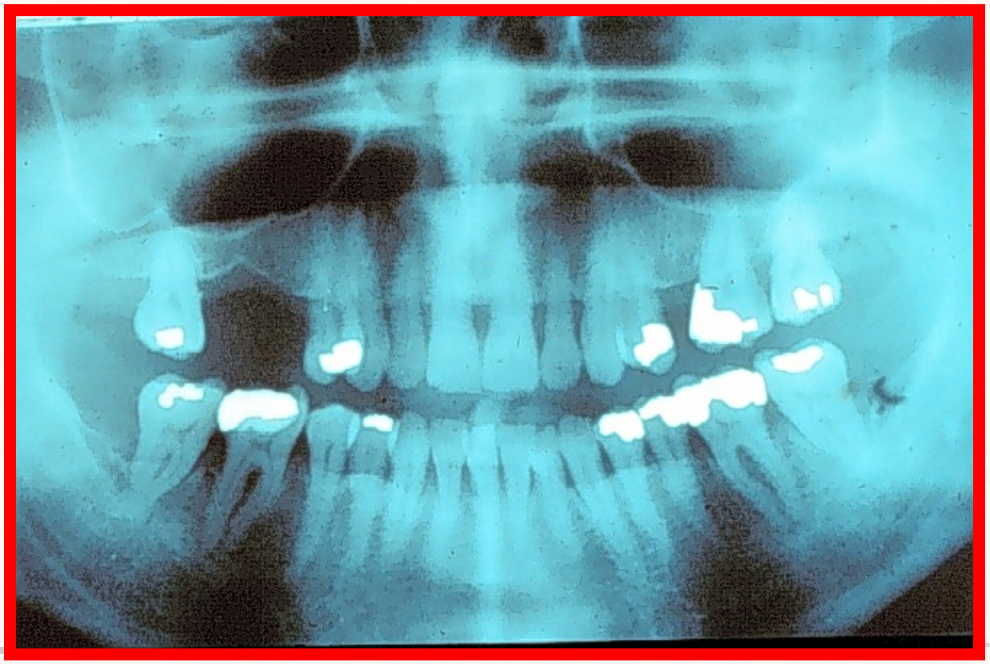


ANTE MORTEM
FEB 97
32 32



POST MORTEM
FEB 98
A98-01

FORAGRAM
LEFT



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A98-01

Types of identification

- Presumptive
  - Visual
  - Anthopometric
  - Personal data
  - Medical history
  - Personal effects
  - Flight manifest and seating position

Guest Check
ACME · 84 · 84

Practical aspects

- Positive identification generally follows presumptive identification
- Release of remains will not occur until after reassociation and certification of identification
- Responsibility for identification belongs to mortuary affairs
  - OAFME generally coordinates identification and performs DNA comparisons

Practical aspects

- Timeliness of identification is most dependent on rapidity of presumptive identification and availability of pre-mortem reference material
  - DNA 48 hrs
  - Dental 1-2 hrs
  - Fingerprints 24-48 hrs
- Post-identification recovery (small fragments)

Flight surgeons role

- Provide accurate manifest with SSN’s ASAP
  - Allows DNA cards to be pulled and premortem patterns determined
- Recovery
  - Accurate gridding, photography, and labeling
  - Complete recovery
  - If in any doubt, protect remains where they lay and wait for AFIP
- Reference material
  - Medical and dental records, panorex and dental bitewings, all pre-mortem radiographs, personal descriptions (know who was on the aircraft)

DNA

- Comparison of DNA with known references
- Nuclear DNA
  - Mendelian
- Mitochondrial DNA
  - Conserved maternal

References

- Direct
  - DNA card
  - Personal effects
  - Trace evidence
  - Tissue specimens
- Indirect
  - Family references

Direct Reference

DNA sample taken *directly* from the deceased individual

PAP smears, repositories, paraffin blocks, wisdom teeth, undergarments

"… the probability of observing another individual with the same profile is conservatively 1 in 565 billion …"

Direct Reference comparisons

Unknown	
D3S1358	15,18
vWA	15,16
FGA	22,23
Amelogenin	X,X
D8S1179	14,16
D21S11	28,33.2
D18S51	11,16
D5S818	10,13
D13S317	11,14
D7S820	9,10

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Indirect Reference

DNA sample taken from the immediate relatives of deceased individual

Biological relatives within a single generation from the deceased (mother, father, son or daughter)

"… the results are 1000 times more likely given that the unidentified remains represent an offspring of *Father* rather than a random man …"

Indirect Reference

Unknown	
D3S1358	15,16
vWA	12,16
FGA	21,22
Amelogenin	X,Y
D8S1179	12,16
D21S11	31,33.2
D18S51	16,17
D5S818	10,11
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Nuclear DNA
1. Biological mother and biological fat

Mother
FGA
22,23
D18S51
11,16

Father
FGA
21,24
D18S51
17,18

Unknown (Daughter?)
FGA 21,22
D18S51 16,17

The results are 4.17 million times more likely given that the remains are the offspring of *Mother* and *Father* rather than the result of a random mating in the U.S. population

Nuclear DNA
2. Spouse and biological children

Spouse (Mother)

FGA	22,23
D18S51	11,16

Unknown (Father?)

FGA	21,24
D18S51	17,18

Child (Daughter)

FGA	21,22
D18S51	16,17

The results are 420 times more likely given that *Unknown* is the father of *Child* rather than a random man in the U.S. population.

Nuclear DNA
3. Biological mother, father, or childre

Mother

FGA	
22,23	
D18S51	
11,16	

Unknown (Son?)

FGA	21,22
D18S51	16,17

The results are 320 times more likely given that *Unknown* remains are the offspring of *Mother* rather than a random woman in the U.S. Population.

Nuclear DNA
4. Multiple siblings that share biologic same mother and father as victim.

Mother
FGA
22,23
D18S51
11,16

Father
FGA
21,24
D18S51
17,18

Unknown
FGA
23,24
D18S51
11,17

Sibling
FGA
21,22
D18S51
16,18

Sibling
FGA
21,22
D18S51
16,17

Return

- Depends on type of specimen
- Depends on condition of specimen
- Depends on quantity of specimen